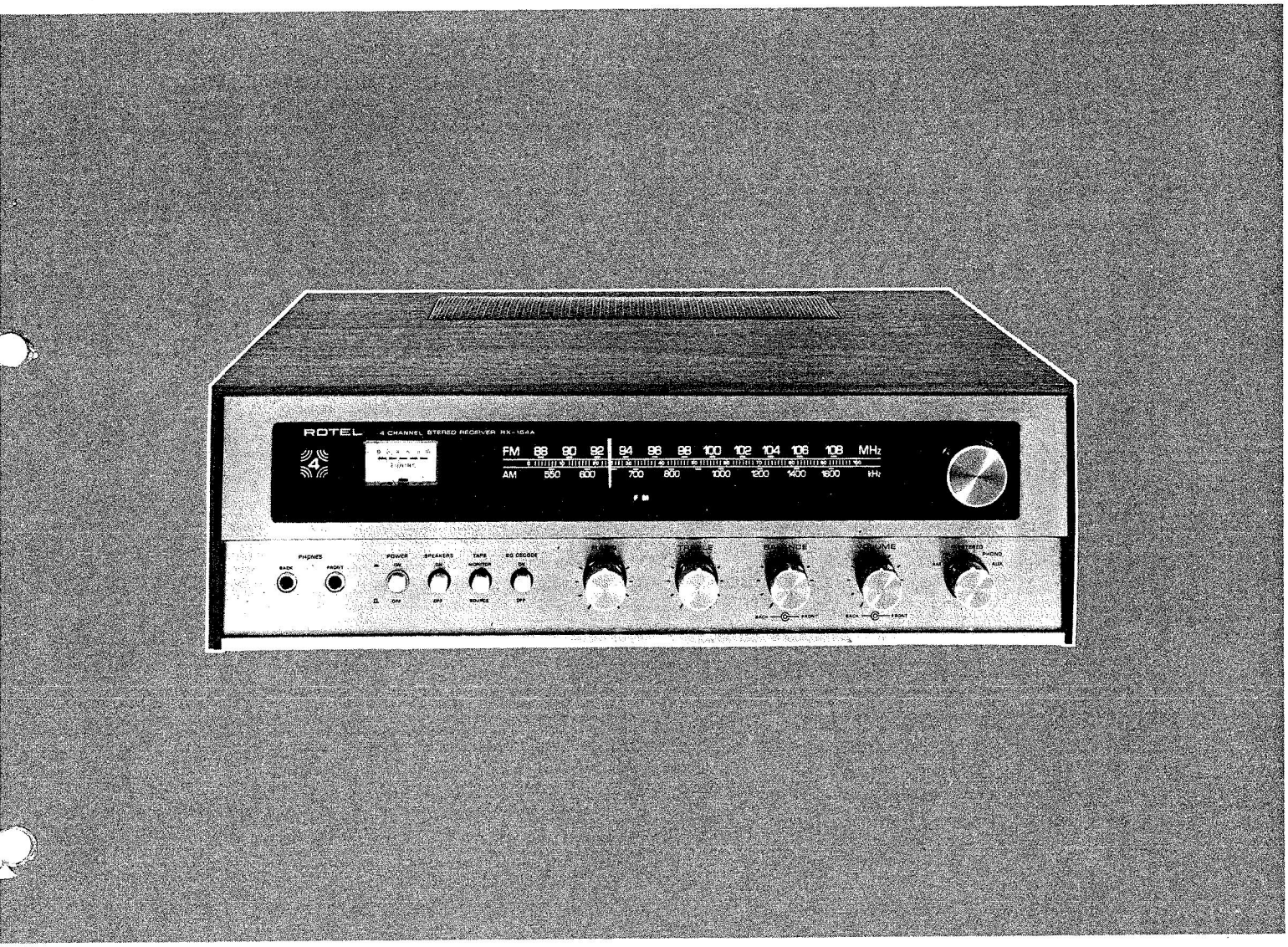
ROTEL®

RX-154A

4 CHANNEL STEREO RECEIVER



technical manual

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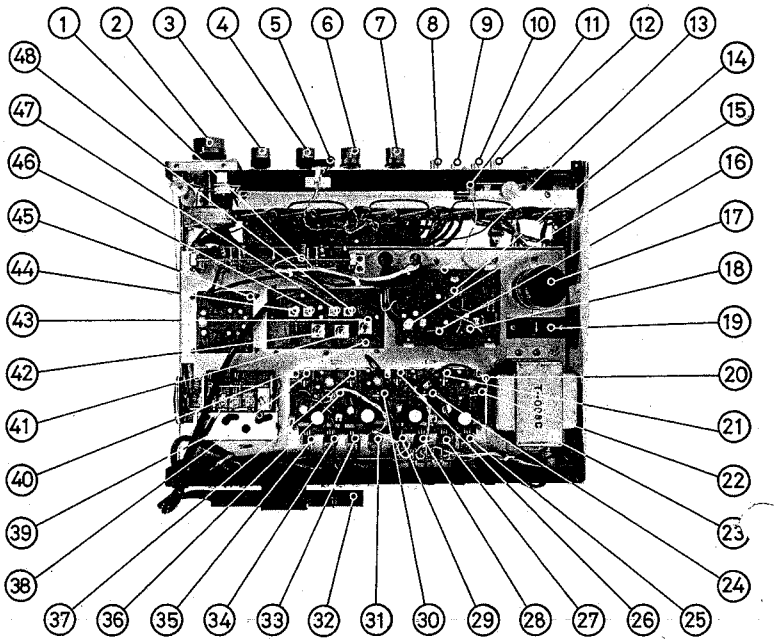
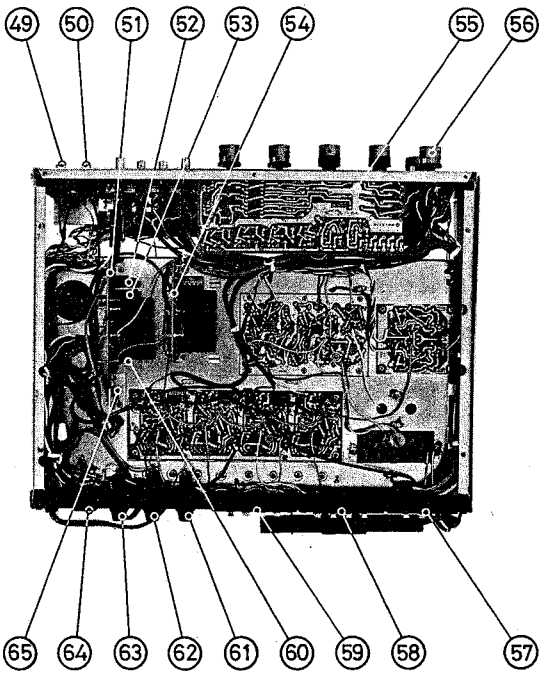
ROTEL

CHASSIS LAYOUT



1. 4 ch. Decoder Circuit Board
2. Tuning
3. Volume Control
4. Balance Control
5. Dial Pointer
6. Treble Control
7. Bass Control
8. SQ Decoder Switch
9. Tape Switch
10. Speakers Switch
11. FM-Stereo Indicator
12. Power Switch
13. FM-Stereo (MPX) Circuit Board
14. T301, MPX 19KHz Trans.
15. L301, MPX 19KHz Coil
16. VR301, Separation Adj.
17. C004, Ripple Filter Capacitor
18. T302, MPX 38KHz Trans.
19. Voltage Selector
20. Main Amp. Circuit Board
21. VR606, Idling Current Adj. Left-Back Channel
22. VR605, DC Balance Adj. Left Back channel
23. T001, Power Transformer
24. VR601, DC Balance Adj. Left-Front channel
25. Tr621, Power Amp. Transistor Left-Back channel
26. VR602, Idling Current Adj. Left-Front channel
27. Tr620, Power Amp. Transistor Left-Back channel
28. Tr607, Power Amp. Transistor Left-Front
29. Tr606, Power Amp. Transistor Left-Front
30. VR607, DC Balance Adj. Right-Back
31. Tr628, Power Amp. Transistor, Right-Back
32. L001, AM Antenna Coil
33. Tr627, Power Amp. Transistor Right-Back
34. Tr614, Power Amp. Transistor Right-Front
35. Tr613, Power Amp. Transistor Right-Front
36. VR603, DC Balance Adj. Right-Front
37. VR608, Idling Current Adj. Right-Back
38. VR604, Idling Current Adj. Right-Front
39. AM/FM Front end
40. IF Amp Circuit Board
41. T102, FM IF, 3rd
42. T101, FM IFT, 2nd
43. T103, FM IFT, Ratio
44. L102, AM OSC Coil
45. Equalizer Amp. Circuit Board
46. T104, AM IFT, 1st
47. T105, AM IFT, 2nd
48. T106, AM IFT, 3rd



49. Phone Jack, Back channel
50. Phone Jack, Front channel
51. Rectifier Circuit Board
52. D803, Rectifier
53. D802, Rectifier
54. Distributing Circuit Board
55. Pre-amplifier Circuit Board
56. Func. Selector Switch
57. Antenna Terminal Strip
58. Front Speakers Terminal Strip
59. Back Speakers Terminal Strip
60. D801, Zener Diode
61. F002, DC Fuse Right
62. F001, DC Fuse Left
63. F003, AC Fuse
64. AC Outlet
65. Tr801, Stabilizer Transistor

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistors failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

DRIVER ADJUSTMENT

1. Set BALANCE, BASS and TREBLE controls to mid-position.
2. Set Mode switch to "QUAD", Decoder switch to "OUT" Tape Mon switch to "OUT" and SELECTOR switch to "AUX" position.
3. Connect 8-ohm, 20 watts resistor across Left Front speaker terminals. Then in parallel with load resistor, connect a VTVM and the vertical input leads of an oscilloscope.
4. Connect an audio signal generator to Left Front channel, AUX input and apply 1,000Hz (sine wave) signals.
5. Connect AC power cord and rotate Volume Control clockwise — full volume. Increase generator output until sine wave on scope just starts clipping. Adjust DC Balance Control VR601 (on Main Amp. Circuit Board) for equal clipping on the positive and negative half cycles of the signal (see Figure 1).
6. Adjust idling current using a DC milli-volt meter across R614 resistor (on Main Amp. Circuit Board), and rotate Idling Adjust Control VR602 to obtain a 7.5 mV reading on DC milli-volt meter (no signal input). See Figure 2.
7. Repeat the steps 3 thru 6 for Left Rear channel (Use VR603, VR604 and R629).
8. Repeat the steps 3 thru 6 for Right channel (Front and Rear). Use VR605, VR606 and R644 (for Front) and VR607, VR608 and R659 (for Rear).

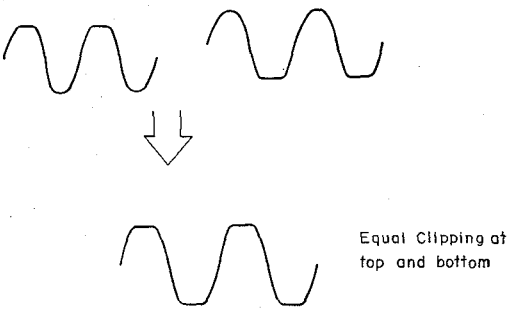


Figure 1

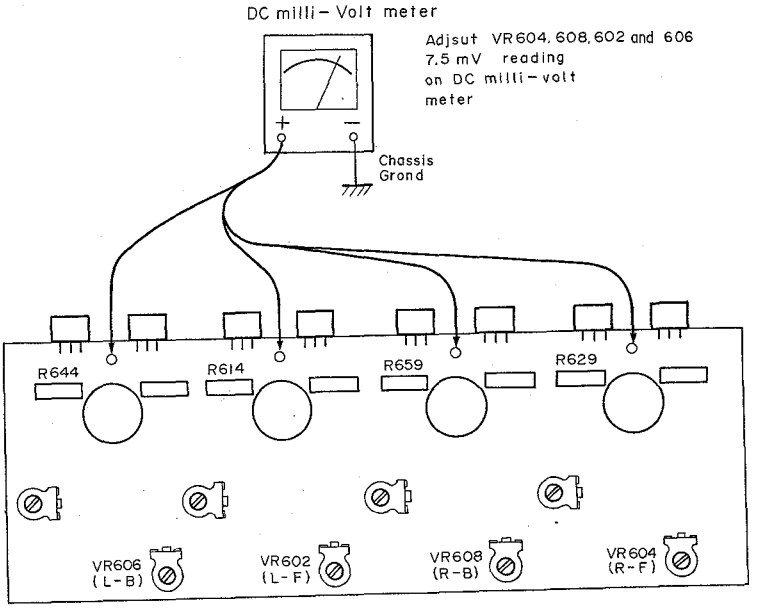


Figure 2

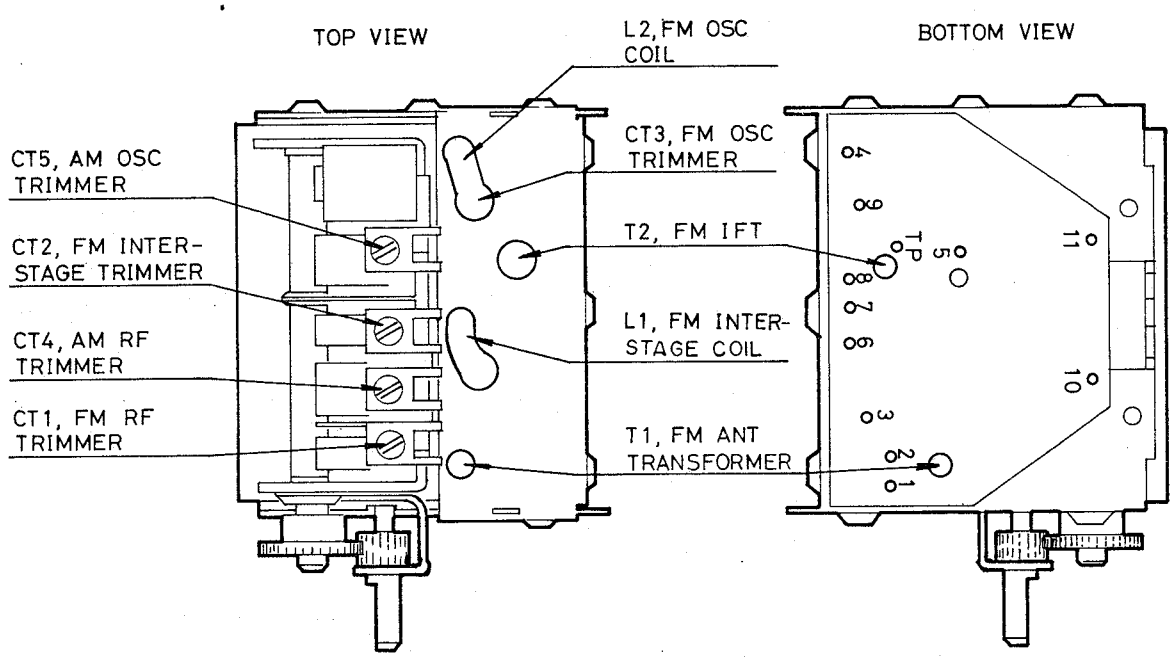
AM ALIGNMENT PROCEDURE

Instruments: AM Signal Generator and AC VTVM.

NOTE: Set Selector switch to AM. Input signal must be kept as low as possible to avoid AVC action.

Step	Generator		Tuning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Coupling	Frequency				
1	Tr104 Base (on IF board #9) through a 0.01 mfd capacitor.	455 KHz (400 Hz 30% mod.)	Non interfering at low end of scale.	AC VTVM to TAPE OUT jack.	T106, 105 and 104 (on IF board)	Maximum reading on VTVM.
2	Connect to short loop of wire. Radiate signal into ferrite loopstick antenna.	600 KHz (400 Hz 30% mod.)	600 KHz		L102 (OSC) (on IF board) & L001 (ANT coil) Ring.	
3		1400 KHz (400 Hz 30% mod.)	1400 KHz		CT5 (OSC trim.) & CT4 (ANT trim.) (on Front-end)	
4	Repeat steps 2 and 3 until no further improvement is noticed.					

FRONT END LAYOUT



FM ALIGNMENT PROCEDURE

Instruments: FM Sweep Generator, FM Signal Generator, AC VTVM and Oscilloscope.

NOTE: Set Selector switch to FM.

Step	Generator		Tuning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Connected to	Frequency				
1	FM Sweep Generator To Test Point (on Front end TP. terminal)	10.7 MHz	Quiet point on band	Oscilloscope to junction of R112 and C116 (on IF board)	T103, 102, 101 (on IF board), & T2 (Front end).	Maximum and Balanced S curve on scope.
2	Disconnect FM Sweep Generator and connect FM Signal Generator to FM antenna terminals.					
3	FM Signal Generator To FM antenna terminals.	98 MHz (400 Hz 100% mod.)	Tune for maximum output point.	Oscilloscope and AC VTVM. to TAPE OUT jack.	Touch up T2 101, 102 and 103 if necessary.	Maximum and undistorted amplitude on scope.
4	Same as in step 3. Signal strength must be kept —3db of limiter saturation.	90 MHz (400 Hz 100% mod.)	90 MHz		L2 (OSC), L1 (RF) & T1 (ANT) (on Front end).	Maximum reading on VTVM.
5		106 MHz (400 Hz 100% mod.)	106 MHz		CT3 (OSC), CT2 (RF) & CT1 (ANT) (on Front end).	
6	Repeat steps 4 and 5 until no further improvement is noticed.					

FM-STEREO (MPX) ALIGNMENT PROCEDURE

Instruments: FM Stereo Generator, AC VTVM and Oscilloscope.

NOTE: The FM IF Amplifier Alignment must be completed before attempting this MPX Alignment. Poor IF alignment will result in poor Multiplex Adjustment.

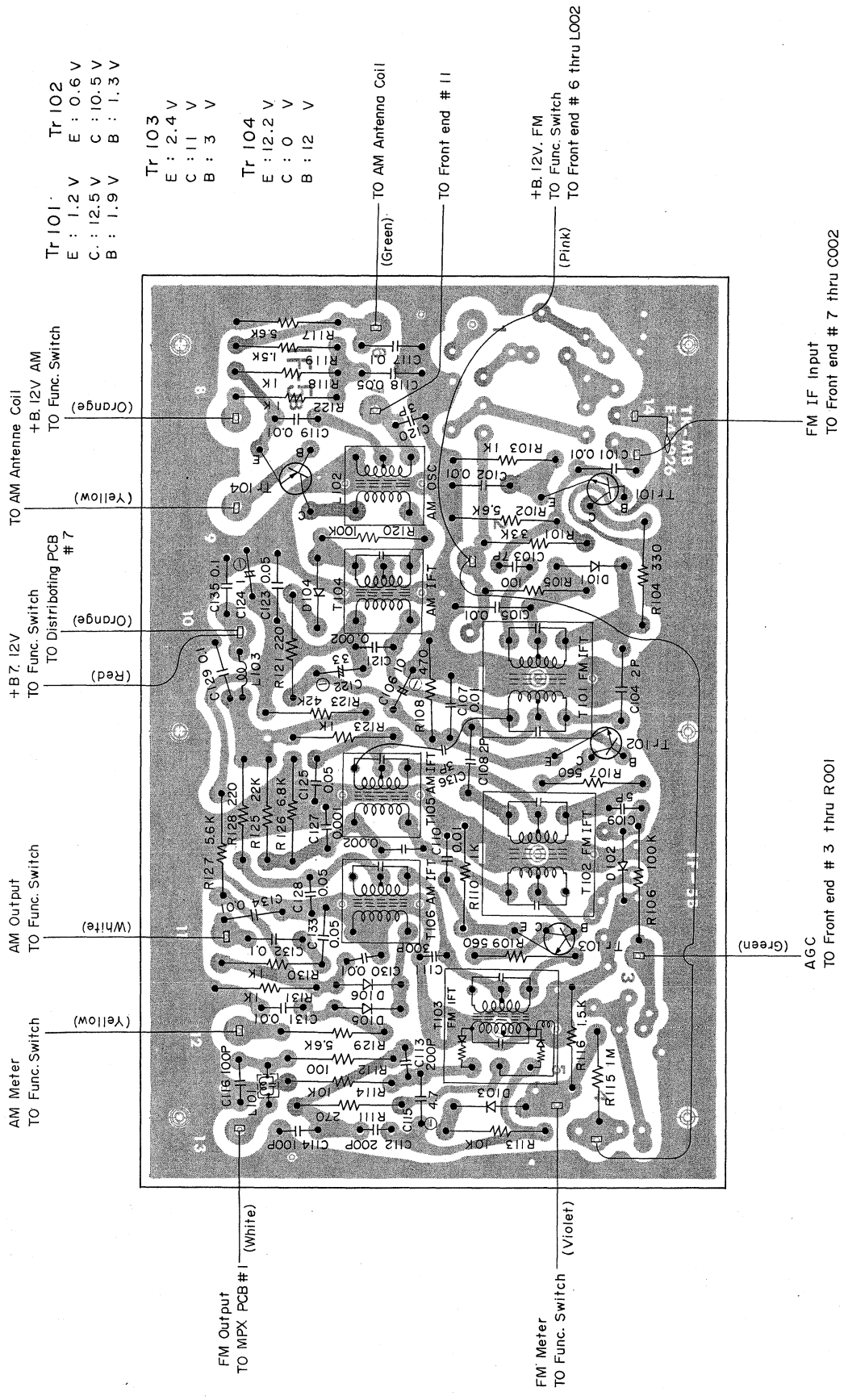
Set MPX Separation Control VR301 (on MPX board) to mid-position before starting this procedure.

Set Selector switch to FM STEREO.

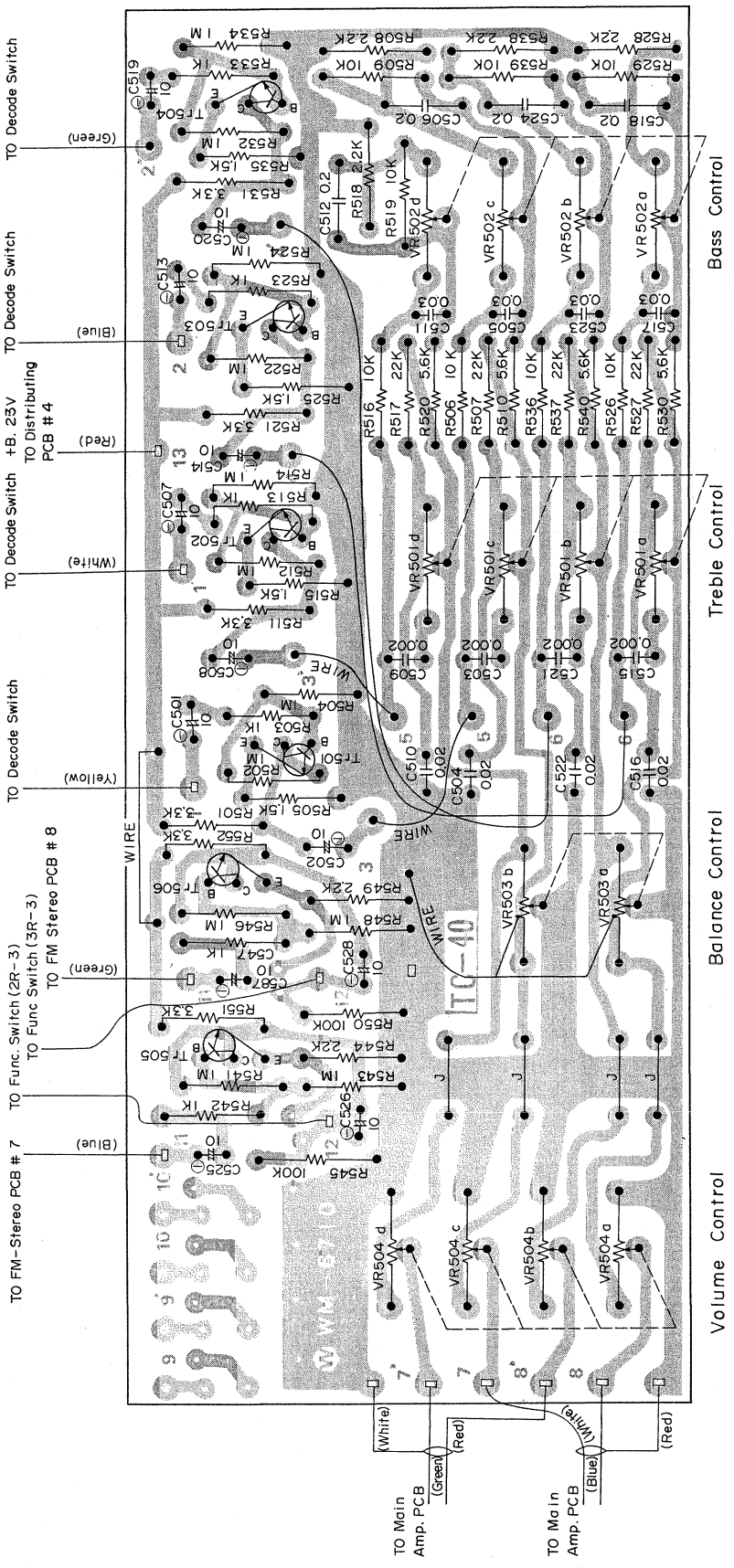
Connect Stereo Generator to FM antenna terminals.

<table>
<tr><th rowspan="2">Step</th><th colspan="2">Stereo Generator</th><th rowspan="2">Output Indicator Connected to</th><th rowspan="2">Adjust</th><th rowspan="2">Adjust for</th></tr>
<tr><th>Modulation</th><th>RF Deviation</th></tr>
<tr><td>1</td><td>19KHz Pilot signal only</td><td>1 – 2%</td><td>VTVM & Oscilloscope to Test Point TP-2 (on MPX board)</td><td>L301, T301 and 302</td><td>Maximum reading on VTVM.</td></tr>
<tr><td>2</td><td>Composite 1 KHz signal to Left channel only</td><td rowspan="3">Pilot 10%
Signal 70%</td><td rowspan="2">VTVM & Oscilloscope to Left channel TAPE OUT jack.</td><td>T301</td><td>Maximum and undistorted sine wave on scope.</td></tr>
<tr><td>3</td><td>Composite 1 KHz signal to Right channel only</td><td rowspan="2">VR301</td><td rowspan="2">Mimimum reading on VTVM.</td></tr>
<tr><td>4</td><td>Same as in step 2.</td><td>VTVM & Oscilloscope to Right channel TAPE OUT jack.</td></tr>
<tr><td>5</td><td colspan="5">Repeat steps 3 and 4 until no further improvement is noticed.</td></tr>
</table>

IF CIRCUIT BOARD DIAGRAM

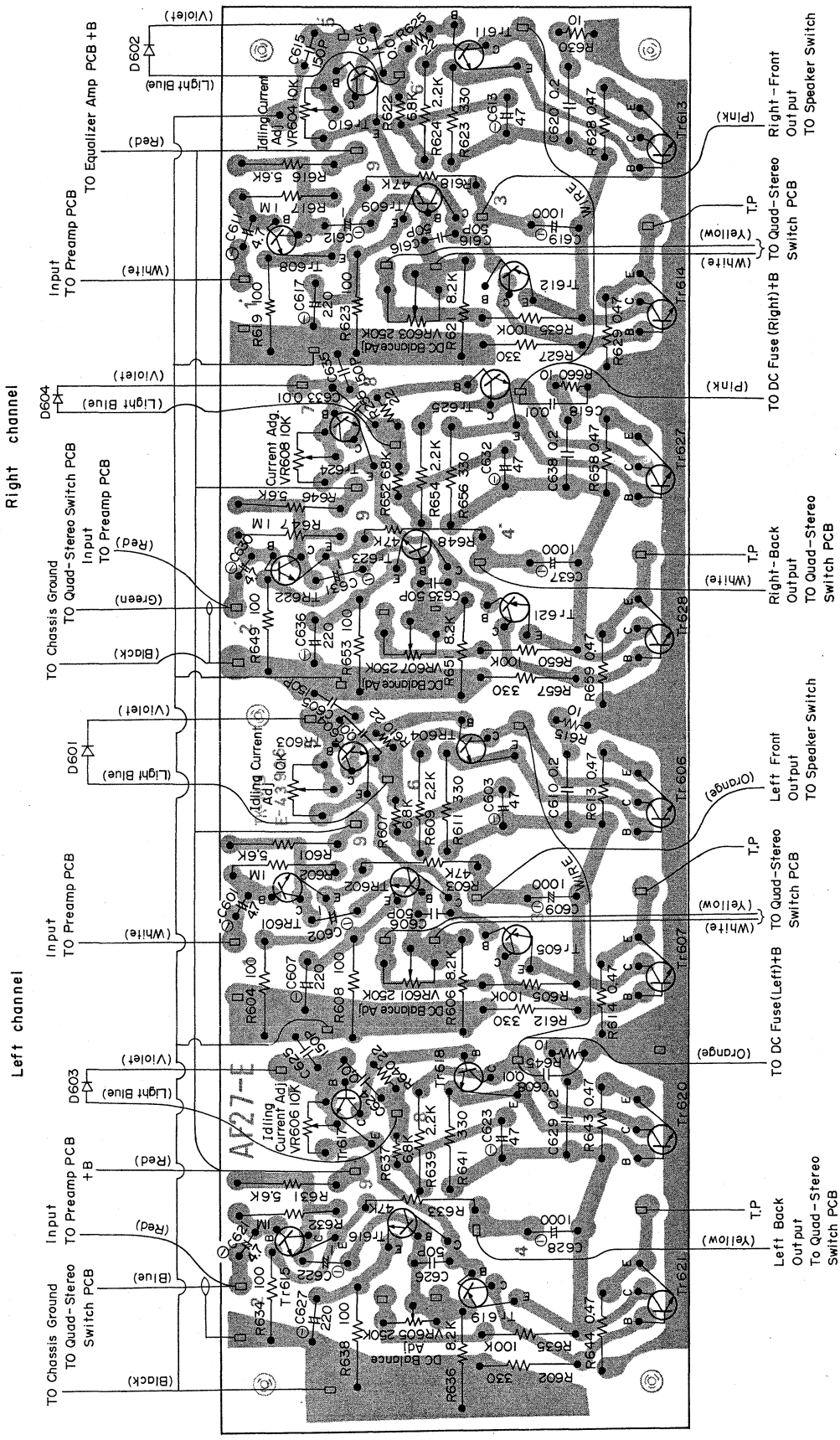


PRE-AMPLIFIER CIRCUIT BOARD DIAGRAM

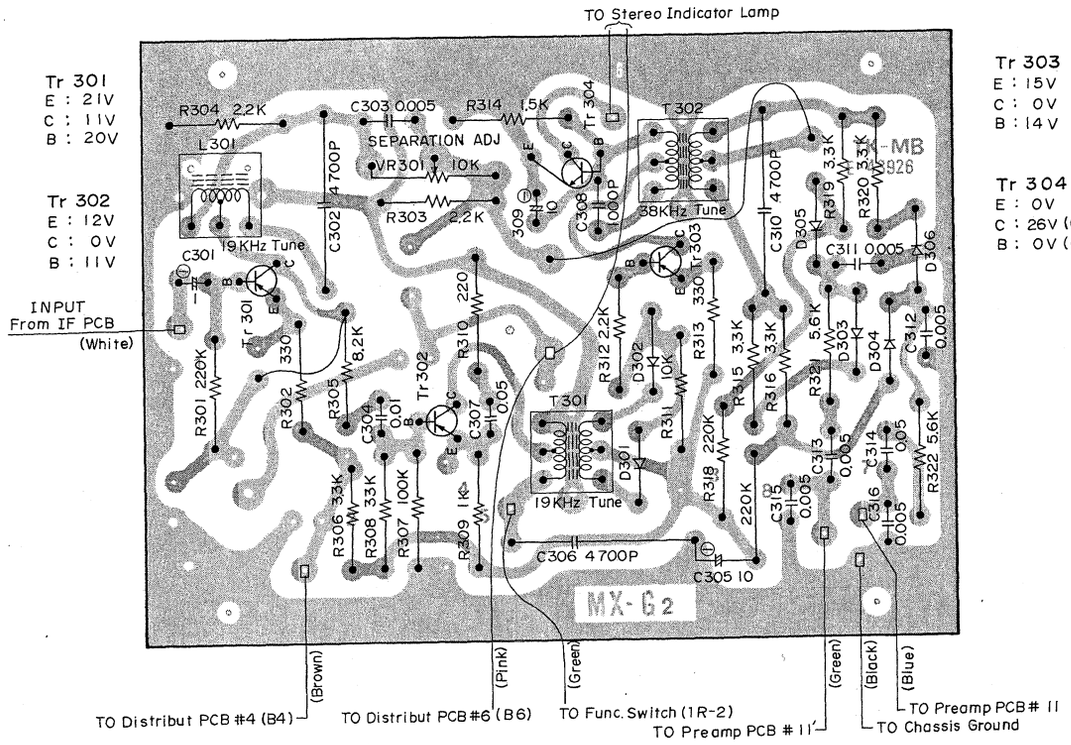


Tr 501,502 Tr 505,506
503,504
E : 3.2 V E : 4.2 V
C : 15 V C : 15 V
B : 4 V B : 4.7 V

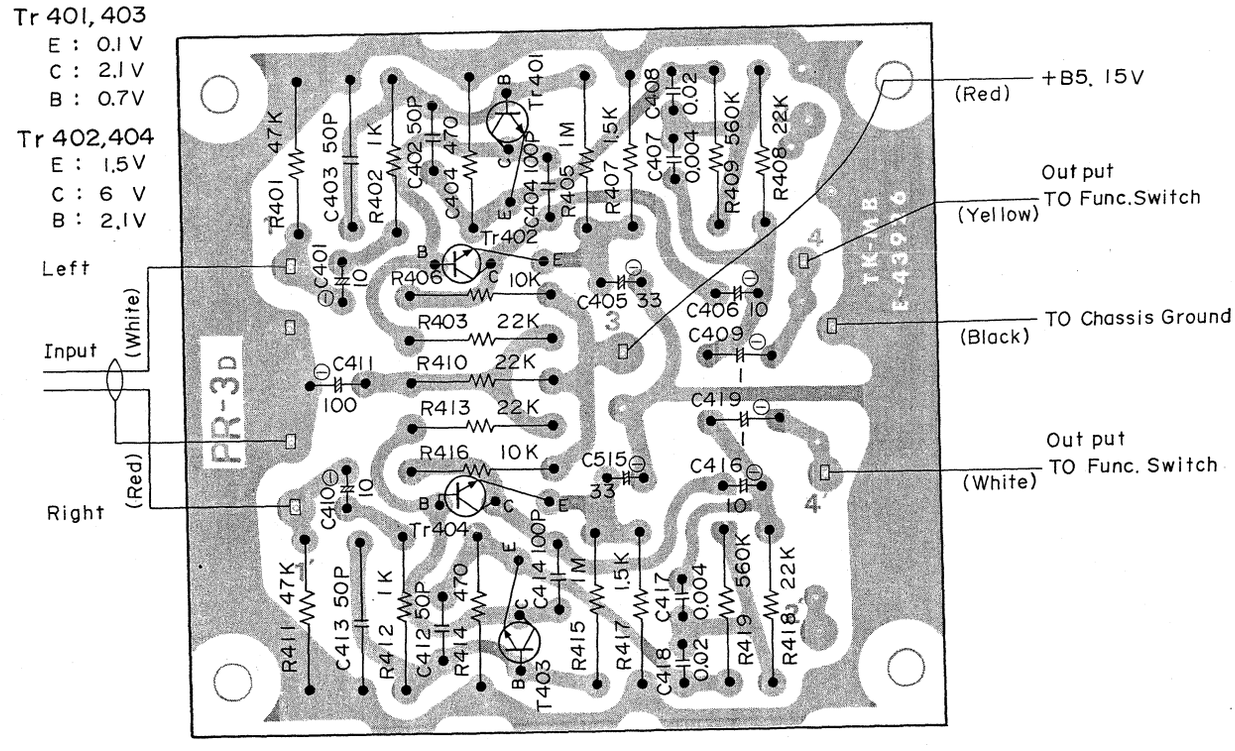
MAIN AMPLIFIER CIRCUIT BOARD DIAGRAM


AF27-F
Right channel
Left channel
Input
TO Preamp PCB
TO Equalizer Amp PCB +B
TO Quad-Stereo Switch PCB
TO Chassis Ground
TO DC Fuse (Right) +B
TO DC Fuse (Left) +B
TO Speaker Switch
Right-Front Output
Right-Back Output
Left Front Output
Left Back Output
T.P
(Violet)
(Light Blue)
(Red)
(White)
(Green)
(Black)
(Pink)
(Yellow)
(Orange)
(Blue)
Idling Current Adj. VR604 10K
Current Adj. VR608 10K
Idling Current Adj. VR606 10K
DC Balance Adj. VR603 250K
DC Balance Adj. VR607 250K
DC Balance Adj. VR601 250K
DC Balance Adj. VR605 250K
D601
D602
D603
D604
Tr 601,608 615,622 E : 0.15 V C : 5 V B : 0.8 V
Tr 602,609 616,623 E : 0.15 V C : 1.9 V B : 0.2 V
Tr 603,610 617,624 E : 1.9 V C : 2.1 V B : 19.5 V
Tr 604,611 618,625 E : 19.5 V C : 0.45 V B : 1.9 V
Tr 606,613 620,627 E : 19.5 V C : 4.5 V B : 2.0 V
Tr 607,614 621,628 E : 7.5 mV C : 19.5 V B : 0.45 V

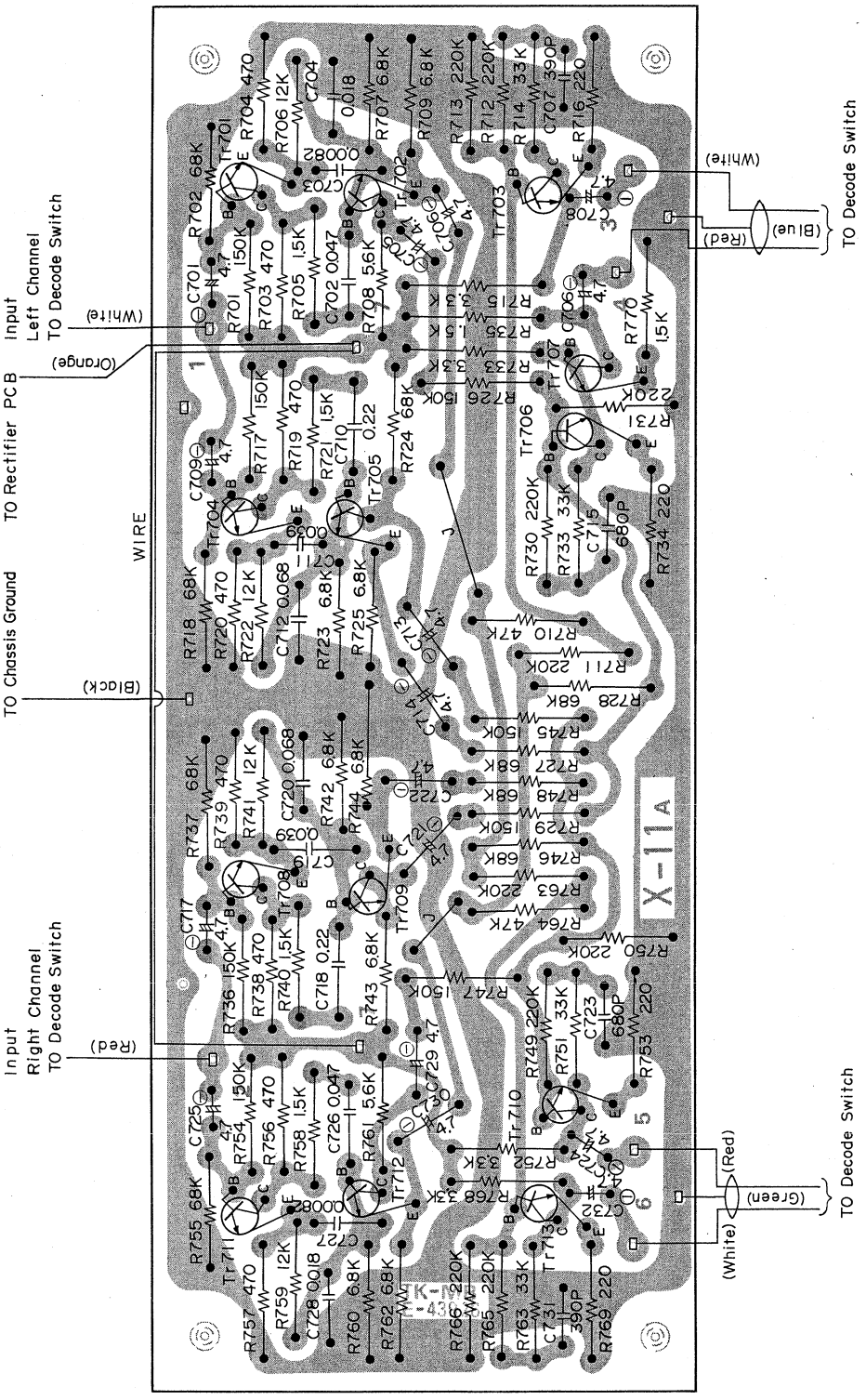
FM-STEREO (MPX) CIRCUIT BOARD DIAGRAM



EQUALIZER AMPLIFIER CIRCUIT BOARD DIAGRAM



4-CHANNEL DECODER CIRCUIT BOARD DIAGRAM



Tr 701, 704, 708, 711
E : 5.5 V
C : 17 V
B : 6.3 V

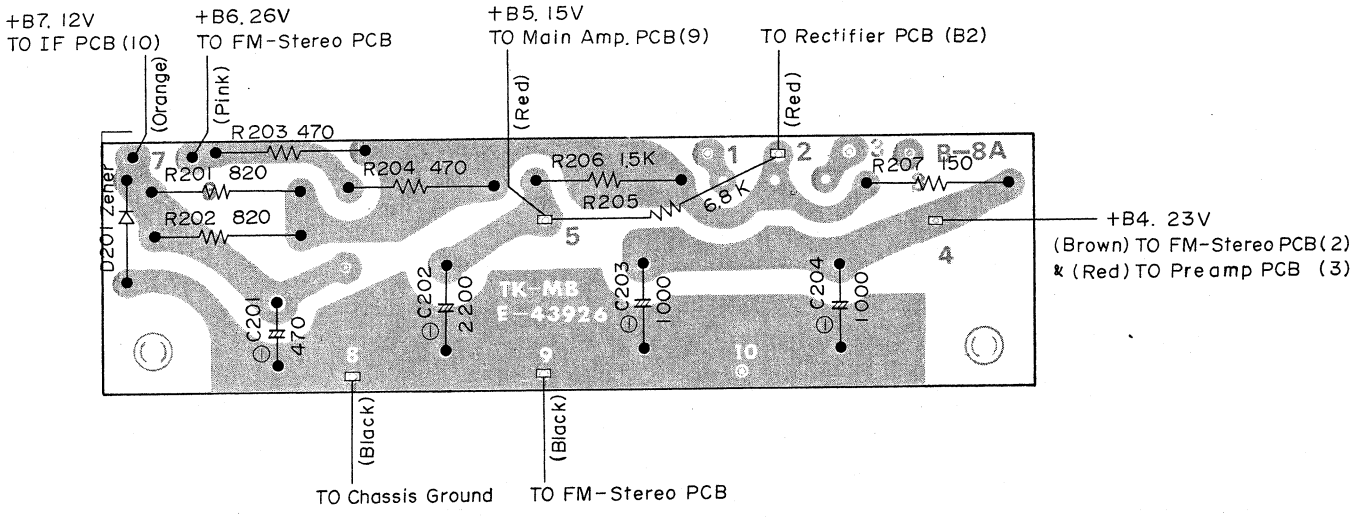
Tr 702, 705, 709, 712
E : 1.5 V
C : 22 V
B : 2 V

Tr 703, 710, 713
E : 1.2 V
C : 5.5 V
B : 1.8 V

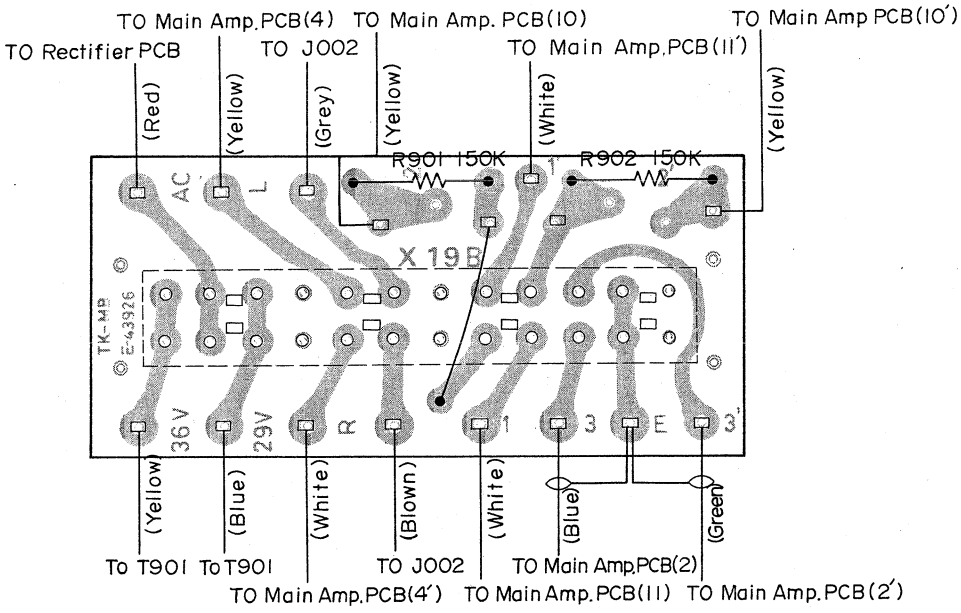
Tr 706
E : 1.2 V
C : 6 V
B : 1.8 V

Tr 707
E : 5.5 V
C : 18 V
B : 6 V

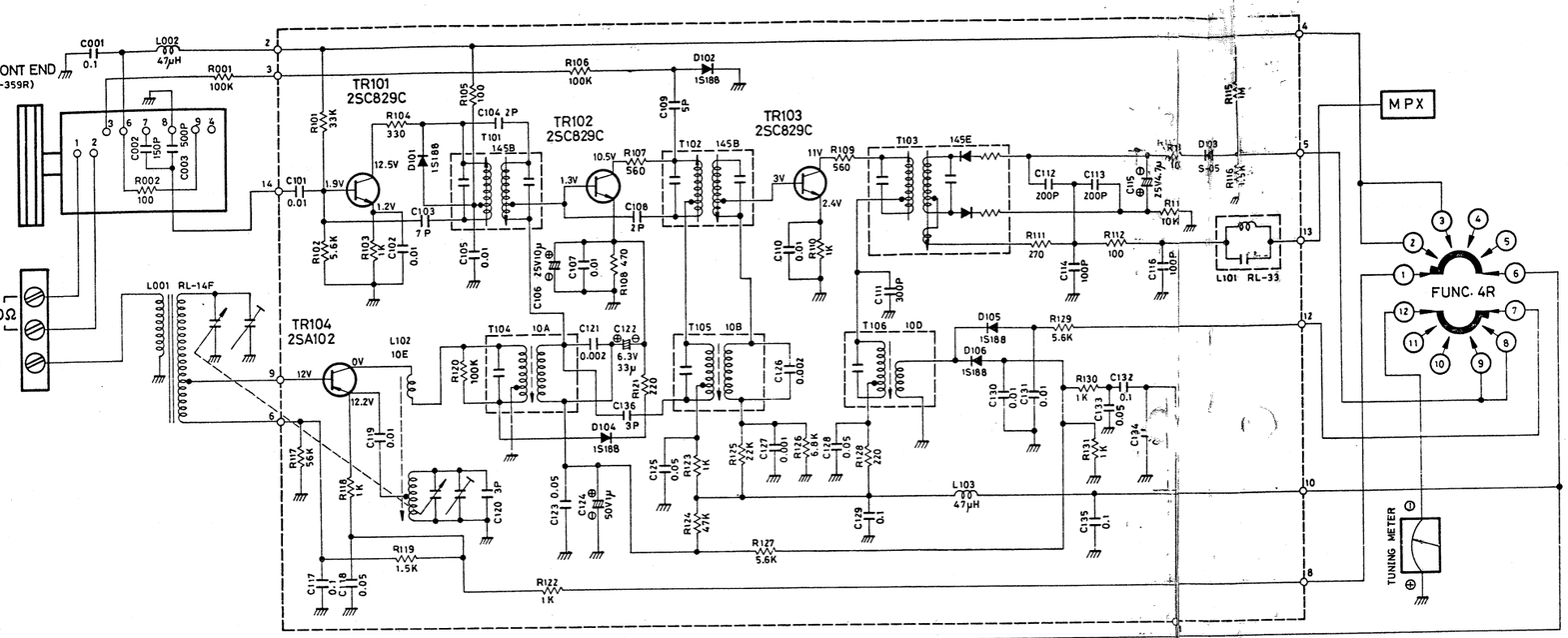
DISTRIBUTING CIRCUIT BOARD DIAGRAM

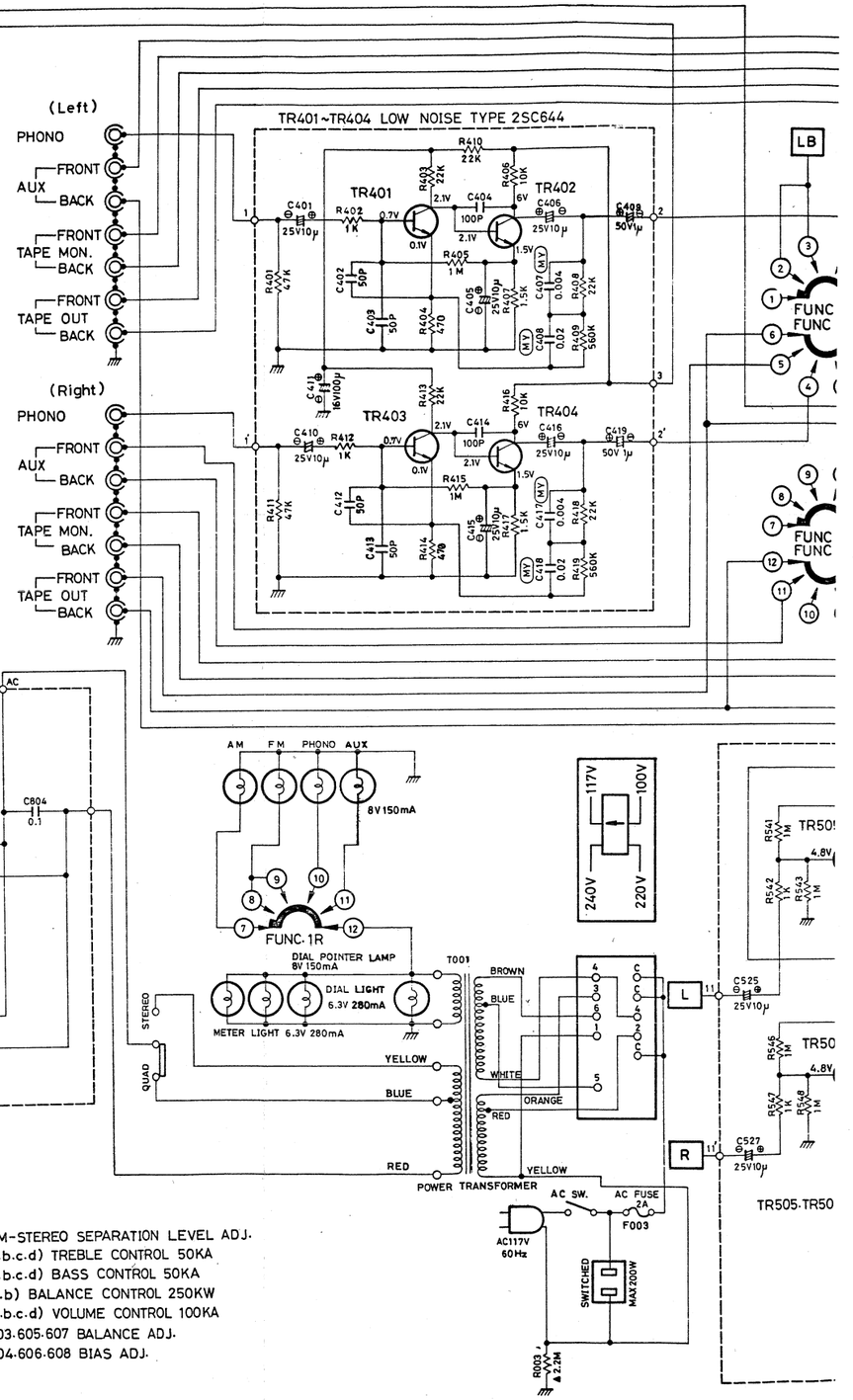


QUAD-STEREO CIRCUIT BOARD DIAGRAM



SCHEMATIC CIRCUIT DIAGRAM



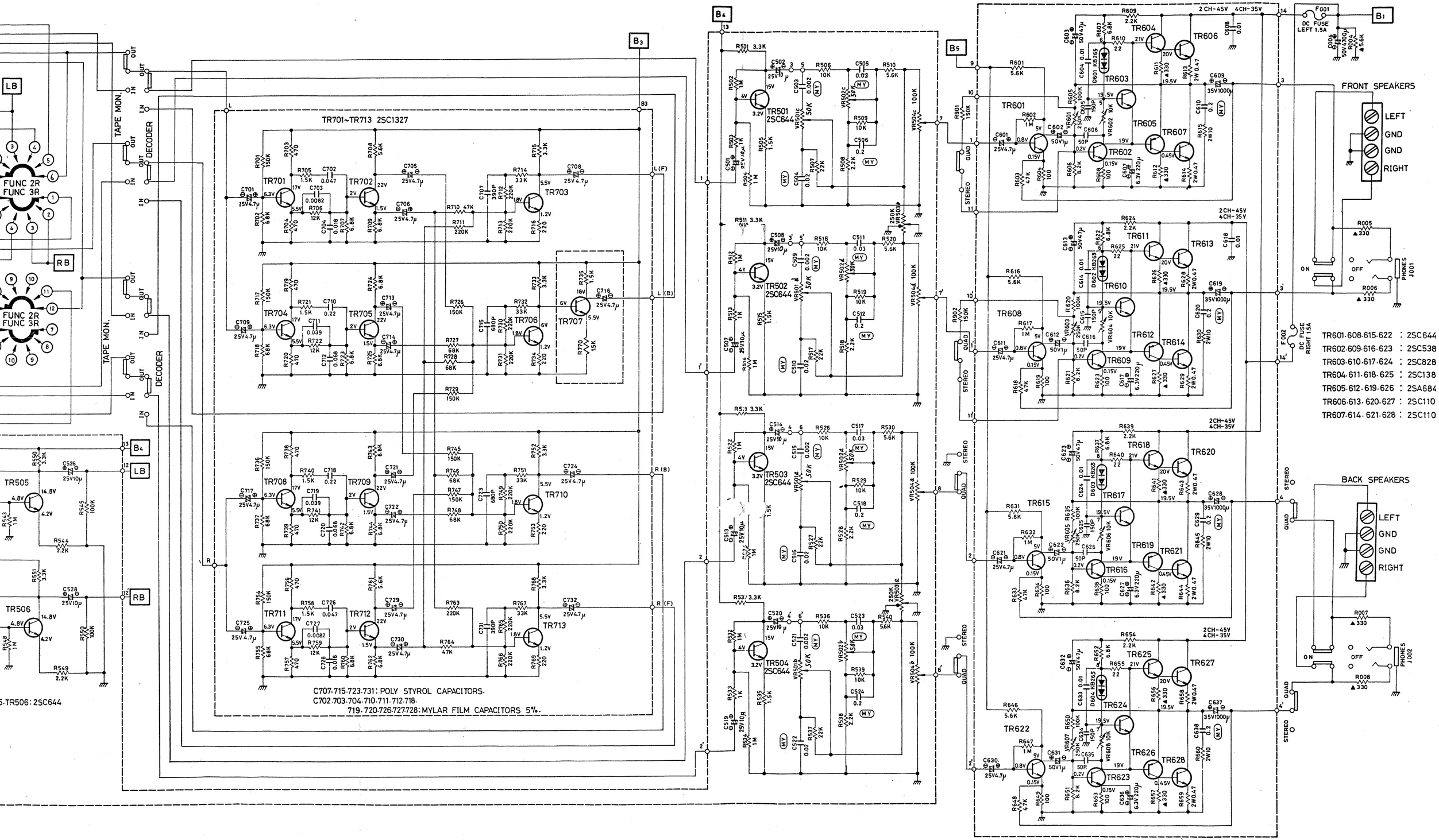


FUNCTION SWITCH
- (1) – (7) AM
- (2) – (8) FM
- (3) – (9) FM STEREO
- (4) – (10) PHONO
- (5) – (11) AUX

RESISTORS
- 10% TOLERANCE 1/4W UNLESS OTHERWISE NOTED.
- K---KILO OHM.
- M---MEGA OHM.
- ▲---COMPOSITION RESISTORS 1/2WATT.
- NON MARK---LOW NOISE TYPE CARBON RESISTORS 1/4WATT.

CAPACITORS
- 10% TOLERANCE UNLESS OTHERWISE NOTED.
- ⊣⊢ ELECTROLYTIC CAPACITORS.
- (MY) MYLAR FILM CAPACITORS.
- (S) POLY STYROL CAPACITORS.
- NON MARK---CERAMIC CAPACITORS.

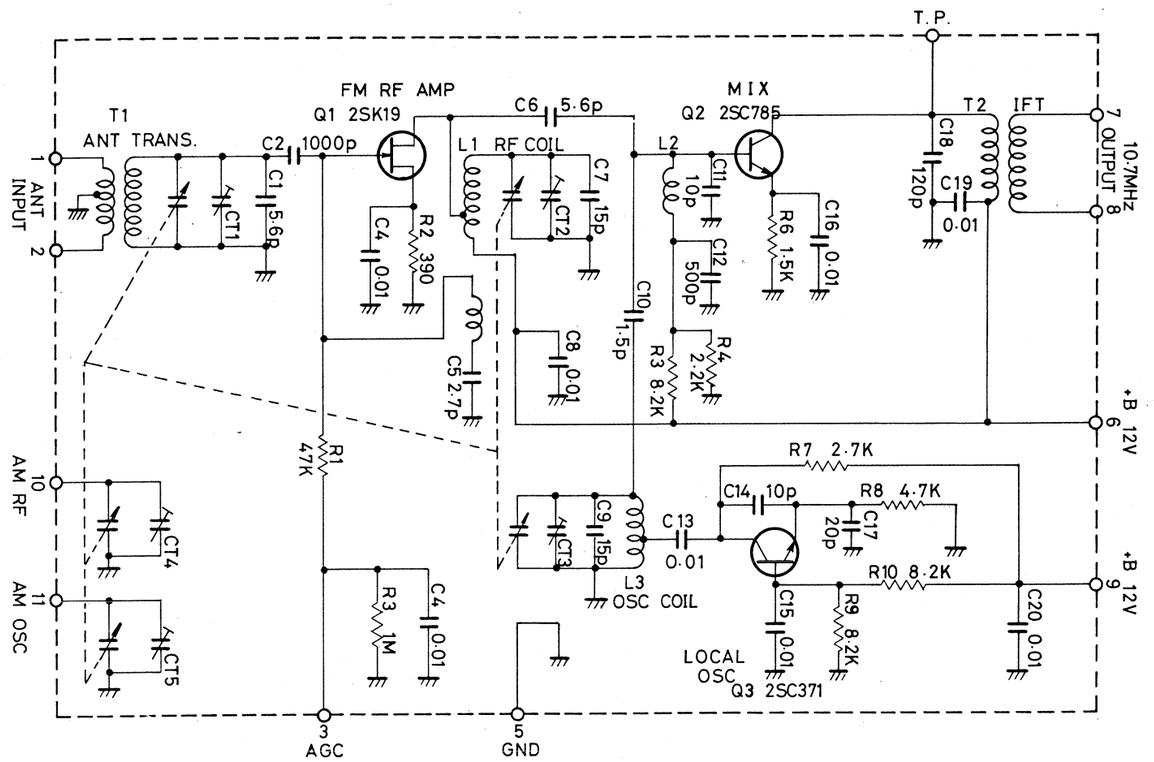
CONTROLS
- VR301 FM-STEREO SEPARATION LEVEL ADJ.
- VR501(a.b.c.d) TREBLE CONTROL 50KA
- VR502(a.b.c.d) BASS CONTROL 50KA
- VR503(a.b) BALANCE CONTROL 250KW
- VR504(a.b.c.d) VOLUME CONTROL 100KA
- VR601·603·605·607 BALANCE ADJ.
- VR602·604·606·608 BIAS ADJ.


TR701~TR713 2SC1327
C707·715·723·731: POLY STYROL CAPACITORS.
C702·703·704·710·711·712·718·
719·720·726·727·728: MYLAR FILM CAPACITORS 5%.
TR601·608·615·622 : 2SC644
TR602·609·616·623 : 2SC538
TR603·610·617·624 : 2SC828
TR604·611·618·625 : 2SC138
TR605·612·619·626 : 2SA684
TR606·613·620·627 : 2SC110
TR607·614·621·628 : 2SC110
FRONT SPEAKERS
BACK SPEAKERS
LEFT
GND
GND
RIGHT
DC FUSE LEFT 1.5A
DC FUSE RIGHT 1.5A
PHONES J001
PHONES J002
TAPE MON.
DECODER
FUNC 2R FUNC 3R
2CH-45V 4CH-35V

16

17

FRONT END SCHEMATIC DIAGRAM



TROUBLE SHOOTING

Unit inoperative (when power activated)

I If the pilot lamp does not light,

A. Check the voltage flow at the AC Outlet, and if no voltage across,
   1. contact between the AC Plug and the wall outlet may be faulty, or
   2. the AC Cord may be broken, or
   3. connections in the Power Switch may be faulty.

B. If there is proper voltage across, check the AC Fuse F003 and
   1. If the fuse in blown,
      (a) capacitor C004 or 804 may be shorted, or
      (b) rectifier D802 or 803 may be shorted, or
      (c) primary or secondary winding of the Power Transformer T001 may be broken.

II If the pilot lamp does light,

A. Measure voltage across B1, B2 and B3 (see schematic diagram) and
   1. If no voltage across B1,
      (a) rectifier D802 or 803 may be opened, or
      (b) secondary winding of the Power Transformer may be broken.
   2. If no voltage across B2 and B3,
      (a) transistor T801 may be opened, or
      (b) capacitor C801, 802 or 803 may be shorted.

B. If there is power voltage across B1, B2, and B3, check then voltage across B4 and B5, and
   1. If no voltage across B4,
      (a) capacitor C203 or 204 may be shorted, or
      (b) resistor R207 may be broken.
   2. If no voltage across B5,
      (a) capacitor C202 may be shorted.

Only two channels operative (Right or Left)

I Check both DC Fuses F001 and F002,

A. If the DC Fuse is blown,
   1. capacitor C608, 609 or 628 (C618, 619 or 637 for the Right Channel) may be faulty, or
   2. transistor Tr604, 605, 607, 618, 619, 620 or 621 (Tr611, 612, 613 614, 625, 626, 627, or 628 for the Right Channel) may be faulty, or
   3. speaker circuits (including speaker systems) may be shorted.

B. If the DC Fuse is not blown,
   1. connections of the fuse may be faulty, or
   2. capacitor C525 or 526 (C527 or 528 for the Right Channel) may be opened, or
   3. transistor Tr505 (Tr506 for the Right Channel) may be faulty.

Front Channels or Back Channels inoperative

I If the Front Channels inoperative,

A. but operative when the DECODER pushbutton switch is at "OUT" position,
   1. capacitor C701, 706 or 708 (C725, 730 or 732 for the Right Channel) may be opened, or
   2. transistor Tr701, 702 or 703 (Tr711, 712 or 713) may be faulty.

B. inoperative even when the DECODER switch is at "OUT" position, then
   1. capacitor C501, 502, 601 or 602 (C507, 508, 611 or 612) may be opened, or
   2. transistor Tr501, 601, 602, 604 or 605 (Tr502, 608, 609, 611 or 612) may be faulty.

II If the Back Channel inoperative,

A. Check to see that
   1. the DECODER switch should be at "IN" position,
   2. the POWER SELECTOR switch (on the rear panel) is in "QUAD" position.

B. If the above are OK,
   1. capacitor C709, 714, 716, 513, 514, 621 or 622 (C717, 722, 724 519, 520, 630 or 631 for the Right Channel) may be opened, or
   2. transistor Tr704, 705, 706, 707, 503, 615, 616, 618 or 619 (Tr708, 709, 710, 504, 622, 623, 625 or 626) may be faulty.

Only PHONO inoperative

I Capacitor C401, 406 or 409 (C410, 416 or 419 for the Right Channel) may be opened, or

II transistor Tr401 or 402 (Tr403 or 404) may be faulty.

Radio Section inoperative

I If both AM and FM are inoperative

A. Measure voltage across B7 (see schematic diagram) and

1. If no voltage across,
   (a) capacitor C129, 135 or 201 may be shorted, or
   (b) zener diode D201 may be shorted
2. If there is proper voltage,
   (a) capacitor C111, 123, 124 or 128 may be shorted or,
   (b) transistor Tr102 or 103 may be faulty, or
   (c) coil L103 may be broken.

II If AM is inoperative

A. Measure voltage of IF PCB (8) and

1. If no voltage,
   (a) connections of the Func. switch may be faulty
2. If there is proper voltage,
   (a) capacitor C118 or 119 may be faulty, or
   (b) transistor Tr104 may be faulty, or
   (c) coil L001 or 102 may be faulty.

III If FM is inoperative

A. Measure voltage of IF PCB (2) and

1. If no voltage,
   (a) connections of the Func. switch may be faulty, or
   (b) capacitor C001 or 105 may be shorted, or
   (c) Front end may be faulty,
      (1). capacitor C8, 18, 19 or 20 may be faulty.
2. If there is proper voltage,
   (a) transistor Tr102 or 301 may be faulty, or
   (b) transformer T101, 102 or 103 may be faulty, or
   (c) coil L101 or 301 may be faulty, or
   (d) capacitor C101 or 301 may be opened, or
   (e) Front end may be faulty.
      (1). transistor Q1, 2 or 3 may be faulty, or
      (2). capacitor C13 or 15 may be faulty.

IV No stereo signal when receiving FM-Stereo broadcast

A. transistor Tr302 or 303 may be faulty, or
B. transformer T301 or 302 may be faulty.

V If there is proper voltage across B6 but Stereo Indicator does not light

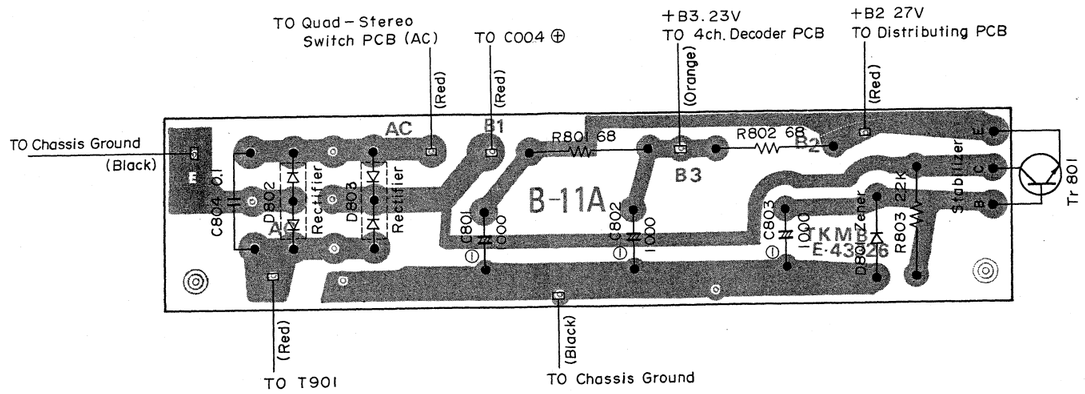
A. Check for audibility of stereo signal.

1. If no signal output, then, check the above mentioned transistors
2. If there is signal output
   (a) transistor Tr304 may be opened, or
   (b) stereo indicator lamp may be faulty.

VI If Stereo Indicator Lamp stays on when signal changes from Stereo to Mono.

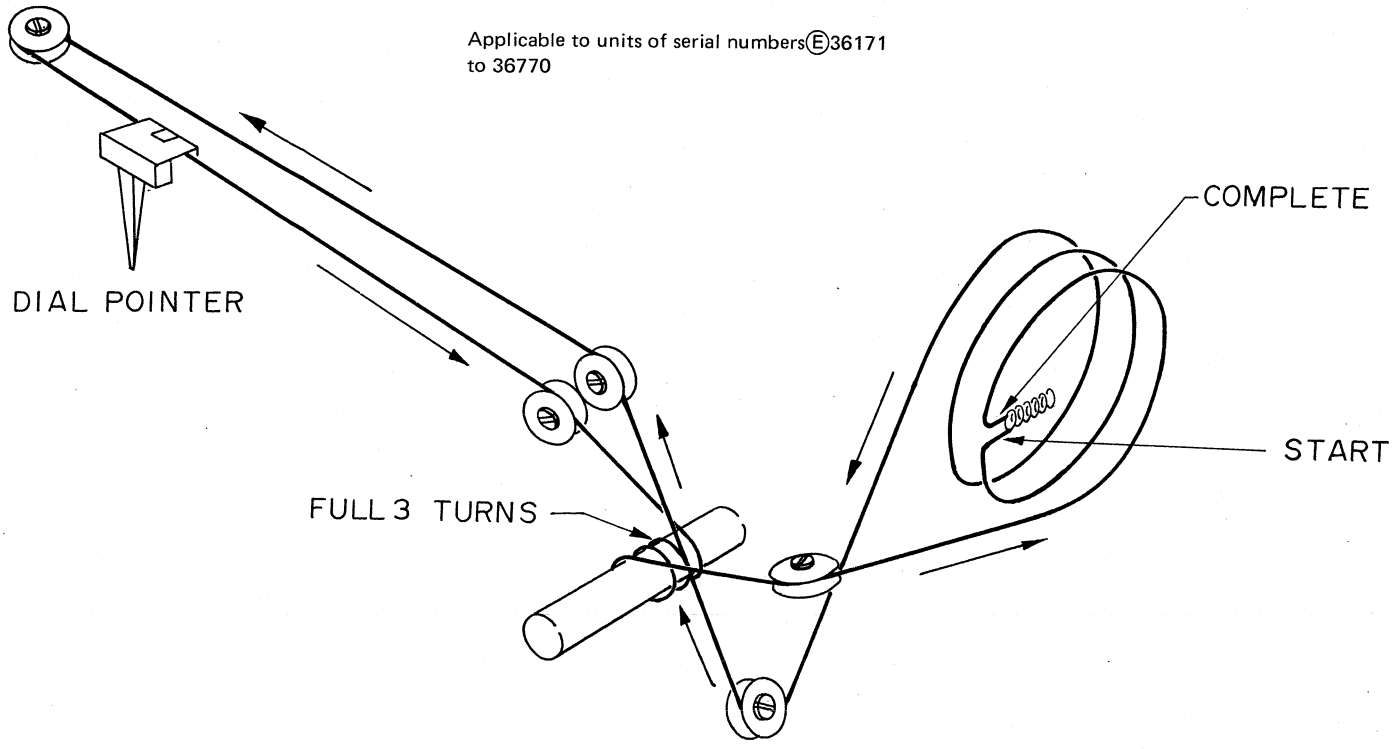
A. transistor Tr304 may be shorted.

RECTIFIER CIRCUIT BOARD DIAGRAM

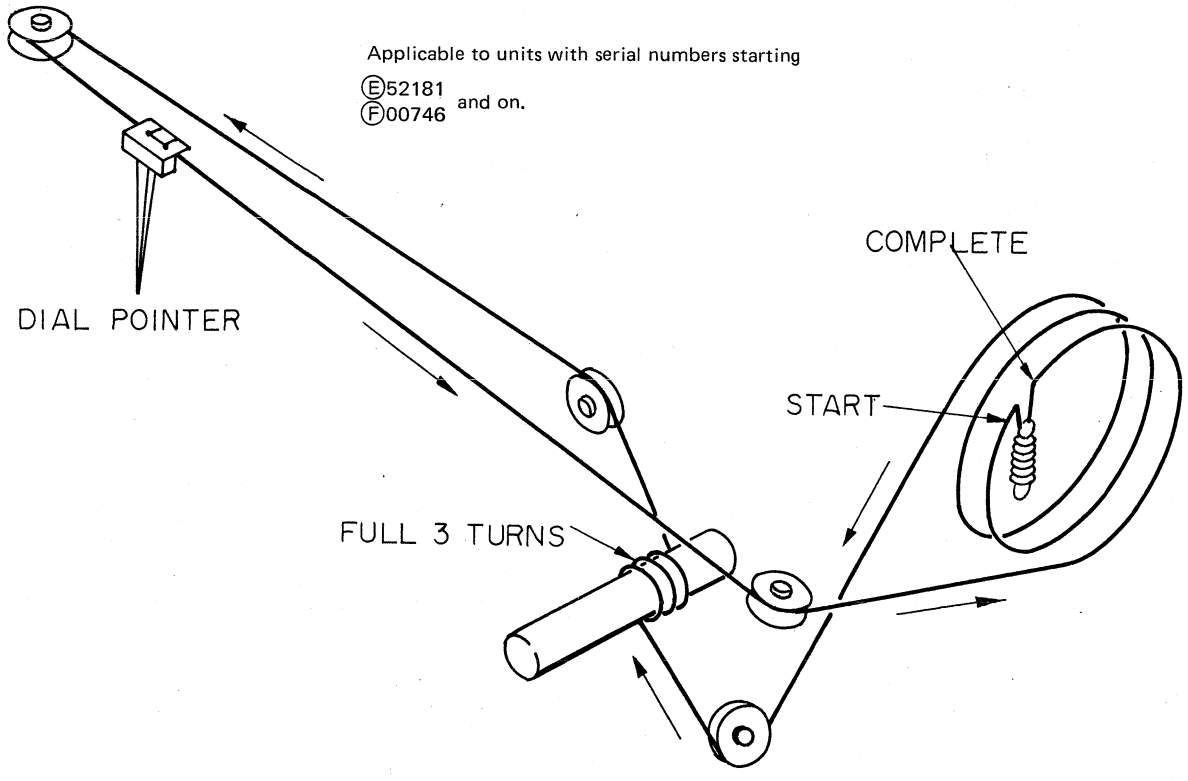


DIAL STRINGING DIAGRAM

Applicable to units of serial numbers Ⓔ36171 to 36770



Applicable to units with serial numbers starting
Ⓔ52181
Ⓕ00746 and on.



Schematic Location	Part No.	Description
R128	552022122	Resistor, Carbon Film, 220 5%, 1/4W
R129	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R130	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
R131	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
	CAPACITORS	
C101	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C102	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C103	440701388	Capacitor, Ceramic, 7pF ±0.5pF, 250V
C104	440201388	Capacitor, Ceramic, 2pF ±0.5pF, 250V
C105	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C106	402100629	Capacitor, Electrolytic, 10mfd, 25V
C107	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C108	440201388	Capacitor, Ceramic, 2pF ±0.5pF, 250V
C109	440501388	Capacitor, Ceramic, 5pF ±0.5pF, 250V
C110	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C111	440301183	Capacitor, Ceramic, 300pF ±10%, 250V
C112	440201183	Capacitor, Ceramic, 200pF ±10%, 250V
C113	440201183	Capacitor, Ceramic, 200pF ±10%, 250V
C114	440101183	Capacitor, Ceramic, 100pF ±10%, 250V
C115	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C116	440101183	Capacitor, Ceramic, 100pF ±10%, 250V
C117	440100835	Capacitor, Ceramic, 0.1mfd, 50V
C118	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C119	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C120	441301336	Capacitor, Ceramic, 3pF (N5.6), 50V
C121	440201085	Capacitor, Ceramic, 0.002mfd, 250V
C122	402330609	Capacitor, Electrolytic, 33mfd, 6.3V
C123	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C124	402100749	Capacitor, Electrolytic, 1mfd, 50V
C125	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C126	440201085	Capacitor, Ceramic, 0.002mfd, 250V
C127	440101085	Capacitor, Ceramic, 0.001mfd, 250V
C128	440500935	Capacitor, Ceramic, 0.05mfd, 50V

Schematic Location	Part No.	Description
C129	440100835	Capacitor, Ceramic, 0.1mfd, 50V
C130	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C131	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C132	440100835	Capacitor, Ceramic, 0.1mfd, 50V
C133	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C134	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C135	440100835	Capacitor, Ceramic, 0.1mfd, 50V
C136	440301388	Capacitor, Ceramic, 3pF ±0.5pF, 250V
	COILS AND TRANSFORMERS	
T101	225501116	Transformer, FM IF, 10.7MHz
T102	225501116	Transformer, FM IF, 10.7MHz
T103	225501117	Transformer, FM IF, Ratio Det.
T104	225301121	Transformer, AM IF, 455KHz
T105	225301122	Transformer, AM IF, 455KHz
T106	225301124	Transformer, AM IF, 455KHz
L101	228641111	Coil, SCA Filter
L102	223301121	Coil, AM Local Oscillator
L103	220001121	Coil, RF Choke, 47uH
	TRANSISTORS AND DIODE	
Tr101	301201117	Transistor, 2SC829C, FM IF 1st Amp.
Tr102	301201117	Transistor, 2SC829C, FM IF 2nd Amp.
Tr103	301201117	Transistor, 2SC829C, FM IF 3rd Amp.
Tr104	301001124	Transistor, 2SA102, AM Converter
D101	300111008	Diode, 1S188, FM Overload Protector
D102	300111008	Diode, 1S188, FM AGC
D103	300919008	Diode, S-05, FM Meter
D104	300111008	Diode, 1S188, AM Overload Protector
D105	300111008	Diode, 1S188, AM Meter
D106	300111008	Diode, 1S188, AM Det.
	140300343	Printed Circuit Board
	141311347	IF Amplifier Circuit Board Assembly

PREAMPLIFIER CIRCUIT BOARD ASSEMBLY

Schematic Location	Part No.	Description
	RESISTORS	
R501	552033222	Resistor, Carbon Film, 3.3K ±5%, 1/4W
R502	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R503	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
R504	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R505	552015222	Resistor, Carbon Film, 1.5K ±5%, 1/4W
R506	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R507	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R508	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R509	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R510	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W

Schematic Location	Part No.	Description
R511	552033222	Resistor, Carbon Film, 3.3K ±5%, 1/4W
R512	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R513	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
R514	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R515	552015222	Resistor, Carbon Film, 1.5K ±5%, 1/4W
R516	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R517	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R518	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R519	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R520	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R521	552033222	Resistor, Carbon Film, 3.3K ±5%, 1/4W
R522	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W

MAIN AMPLIFIER CIRCUIT BOARD ASSEMBLY

Schematic Location	Part No.	Description
	RESISTORS	
R601	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R602	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R603	552047322	Resistor, Carbon Film, 47K ±5%, 1/4W
R604	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R605	552010422	Resistor, Carbon Film, 100K ±5%, 1/4W
R606	552082222	Resistor, Carbon Film, 8.2K ±5%, 1/4W
R607	552068222	Resistor, Carbon Film, 6.8K ±5%, 1/4W
R608	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R609	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R610	552022022	Resistor, Carbon Film, 22 ±5%,1/4W
R611	551033133	Resistor, Composition,330 ±10%,1/2W
R612	551033133	Resistor, Composition, 330 ±10%, 1/2W
R613	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R614	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R615	554010053	Resistor, Bath-tub, 10 ±10%, 2W
R616	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R617	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R618	552047322	Resistor, Carbon Film, 47K ±5%,1/4W
R619	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R620	552010422	Resistor, Carbon Film, 100K ±5%, 1/4W
R621	552082222	Resistor, Carbon Film, 8.2K ±5%, 1/4W
R622	552068222	Resistor, Carbon Film, 6.8K ±5%, 1/4W
R623	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R624	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R625	552022022	Resistor, Carbon Film, 22 ±5%, 1/4W
R626	551033133	Resistor, Composition, 330 ±10%, 1/2W
R627	551033133	Resistor, Composition, 330 ±10%, 1/2W
R628	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R629	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R630	554010053	Resistor, Bath-tub, 10 ±10%, 2W
R631	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R632	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R633	552047322	Resistor, Carbon Film, 47K ±5%, 1/4W
R634	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R635	552010422	Resistor, Carbon Film, 100K ±5%, 1/4W
R636	552082222	Resistor, Carbon Film, 8.2K ±5%, 1/4W
R637	552068222	Resistor, Carbon Film, 6.8K ±5%, 1/4W
R638	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R639	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R640	552022022	Resistor, Carbon Film, 22 ±5%, 1/4W
R641	551033133	Resistor, Composition, 330 ±10%, 1/2W
R642	551033133	Resistor, Composition, 330 ±10%, 1/2W
R643	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R644	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R645	554010053	Resistor, Bath-tub, 10 ±10%, 2W
R646	552056222	Resistor, Carbon Film, 5.6K ±5%, 1/4W
R647	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R648	552047322	Resistor, Carbon Film, 47K ±5%, 1/4W
R649	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R650	552010422	Resistor, Carbon Film, 100K ±5%, 1/4W
R651	552082222	Resistor, Carbon Film, 8.2K ±5%, 1/4W
R652	552068222	Resistor, Carbon Film, 6.8K ±5%, 1/4W
R653	552010122	Resistor, Carbon Film, 100 ±5%, 1/4W
R654	552022222	Resistor, Carbon Film, 2.2K ±5%, 1/4W
R655	552022022	Resistor, Carbon Film, 22 ±5%, 1/4W
R656	551033133	Resistor, Composition, 330 ±10%, 1/2W
R657	551033133	Resistor, Composition, 330 ±10%, 1/2W
R658	554147963	Resistor, Bath-tub, 0.47 ±10%, 2W
R659	554147953	Resistor, Bath-tub, 0.47 ±10%, 2W
R660	554010053	Resistor, Bath-tub, 10 ±10%, 2W
VR601	510502127	Potentiometer, 250K, DC Balance Adj. (L-F)
VR602	510502126	Potentiometer, 10K, Bias Adj. (L-F)
VR603	510502127	Potentiometer, 250K, DC Balance Adj. (R-F)
VR604	510502126	Potentiometer, 10K, Bias Adj. (R-F)
VR605	510502127	Potentiometer, 250K, DC Balance Adj. (L-R)
VR606	510502126	Potentiometer, 10K, Bias Adj. (L-R)
VR607	510502127	Potentiometer, 250K, DC Balance Adj. (R-R)
VR608	510502126	Potentiometer, 10K, Bias Adj. (R-R)
	CAPACITORS	
C601	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C602	402100749	Capacitor, Electrolytic, 1mfd, 50V
C603	402470649	Capacitor, Electrolytic, 47mfd, 50V
C604	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C605	440151183	Capacitor, Ceramic, 150pF ±10%, 250V
C606	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C607	402220509	Capacitor, Electrolytic, 220mfd, 6.3V
C608	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C609	402100439	Capacitor, Electrolytic, 1,000mfd, 35V
C610	450200833	Capacitor, Mylar Film, 0.2mfd ±10%, 50V
C611	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C612	402100749	Capacitor, Electrolytic, 1mfd, 50V
C613	402470649	Capacitor, Electrolytic, 47mfd, 50V
C614	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C615	440151183	Capacitor, Ceramic, 150pF ±10%, 250V
C616	440501283	Capacitor, Ceramic, 50pF ± 10%, 250V
C617	402220509	Capacitor, Electrolytic, 220mfd, 6.3V
C618	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C619	402100439	Capacitor, Electrolytic, 1,000mfd, 35V
C620	450200833	Capacitor, Mylar Film, 0.2mfd ±10%,50V
C621	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C622	402100749	Capacitor, Electrolytic, 1mfd, 50V
C623	402470649	Capacitor, Electrolytic, 47mfd, 50V
C624	440100985	Capacitor, Ceramic, 0.01mfd, 250V
C625	440151183	Capacitor, Ceramic, 150pF ±10%, 250V
C626	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C627	402220509	Capacitor, Electrolytic, 220mfd, 6.3V
C628	402100439	Capacitor, Electrolytic, 1,000mfd, 35V
C629	450200833	Capacitor, Mylar Film, 0.2mfd, ±10%, 50V
C630	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C631	402100749	Capacitor, Electrolytic, 1mfd, 50V

Schematic Location	Part No.	Description
C307	450500933	Capacitor, Mylar Film, 0.05mfd ±10%, 50V
C308	454101073	Capacitor, Polystyrene Film, 1,000pF ±10%
C309	402100629	Capacitor, Electrolytic, 10mfd, 25V
C310	453471033	Capacitor, Polystyrene Film, 4,700pF ±10%
C311	442501083	Capacitor, Ceramic, 0.005mfd ±10%, 250V
C312	442501083	Capacitor, Ceramic, 0.005mfd ±10%, 250V
C313	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C314	440500935	Capacitor, Ceramic, 0.05mfd, 50V
C315	442501083	Capacitor, Ceramic, 0.005mfd ±10%, 250V
C316	442501083	Capacitor, Ceramic, 0.005mfd ±10%, 250V
T301	225601126	Transformer, MPX, 19KHz

Schematic Location	Part No.	Description
T302	225601126	Transformer, MPX, 38KHz
L301	225601125	Coil, MPX, 19KHz
		TRANSISTORS AND DIODES
Tr301	301001111	Transistor, 2SA49, Composite Amp.
Tr302	301001111	Transistor, 2SA49, 19KHz Amp.
Tr303	301001111	Transistor, 2SA49, 38KHz Amp.
Tr304	301201132	Transistor, 2SC1384, Stereo Ind. Driver
D301	300111008	Diode, 1S188, Doubler
D302	300111008	Diode, 1S188, Doubler
D303	300111008	Diode, 1S188, Decoder
D304	300111008	Diode, 1S188, Decoder
D305	300111008	Diode, 1S188, Decoder
D306	300111008	Diode, 1S188, Decoder
	140400438	Printed Circuit Board
	141411427	MF-Stereo Circuit Board Assembly

EQUALIZER AMPLIFIER CIRCUIT BOARD ASSEMBLY

Schematic Location	Part No.	Description
		RESISTORS
R401	552047322	Resistor, Carbon Film, 47K ±5%, 1/4W
R402	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
R403	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R404	552047122	Resistor, Carbon Film, 470 ±5%, 1/4W
R405	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R406	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R407	552015222	Resistor, Carbon Film, 1.5K ±5%, 1/4W
R408	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R409	552056422	Resistor, Carbon Film, 560K ±5%, 1/4W
R410	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R411	552047322	Resistor, Carbon Film, 47K ±5%, 1/4W
R412	552010222	Resistor, Carbon Film, 1K ±5%, 1/4W
R413	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R414	552047122	Resistor, Carbon Film, 470 ±5%, 1/4W
R415	552010522	Resistor, Carbon Film, 1M ±5%, 1/4W
R416	552010322	Resistor, Carbon Film, 10K ±5%, 1/4W
R417	552015222	Resistor, Carbon Film, 1.5K ±5%, 1/4W
R418	552022322	Resistor, Carbon Film, 22K ±5%, 1/4W
R419	552056422	Resistor, Carbon Film, 560K ±5%, 1/4W
		CAPACITORS
C401	402100629	Capacitor, Electrolytic, 10mfd, 25V
C402	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C403	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C404	440101183	Capacitor, Ceramic, 100pF ±10%, 250V
C405	402330609	Capacitor, Electrolytic, 33mfd, 6.3V

Schematic Location	Part No.	Description
C406	402100629	Capacitor, Electrolytic, 10mfd, 25V
C407	442401083	Capacitor, Ceramic, 0.004mfd ±10%, 250V
C408	450200933	Capacitor, Mylar Film, 0.02mfd ±10%, 50V
C409	440100835	Capacitor, Ceramic, 0.1mfd, 50V
C410	402100629	Capacitor, Electrolytic, 10mfd, 25V
C411	402100519	Capacitor, Electrolytic, 100mfd, 16V
C412	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C413	440501283	Capacitor, Ceramic, 50pF ±10%, 250V
C414	440101183	Capacitor, Ceramic, 100pF ±10%, 250V
C415	402330609	Capacitor, Electrolytic, 33mfd, 6.3V
C416	402100629	Capacitor, Electrolytic, 10mfd, 25V
C417	442401083	Capacitor, Ceramic, 0.004mfd ±10%, 250V
C418	450200933	Capacitor, Mylar Film, 0.02mfd ±10%, 50V
C419	440100835	Capacitor, Creamic, 0.1mfd, 50V
		TRANSISTORS
Tr401	301201114	Transistor, 2SC644, Left 1st Amp.
Tr402	301201114	Transistor, 2SC644, Left 2nd Amp.
Tr403	301201114	Transistor, 2SC644, Right 1st Amp.
Tr404	301201114	Transistor, 2SC644, Right 2nd Amp.
	140500523	Printed Circuit Board
	141510123	Equalizer Amplifier Circuit Board Assembly

Schematic Location	Part No.	Description
C723	454681173	Capacitor, Polystyrene Film, 680pF ± 10%
C724	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C725	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C726	452470932	Capacitor, Mylar Film, 0.047mfd ±5%, 50V
C727	452821032	Capacitor, Mylar Film, 0.0082mfd ±5%, 50V
C728	452180932	Capacitor, Mylar Film, 0.018mfd ±5%, 50V
C729	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C730	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
C731	454391173	Capacitor, Polystyrene Film, 390pF ±10%
C732	402470729	Capacitor, Electrolytic, 4.7mfd, 25V
	TRANSISTORS	
Tr701	301201134	Transistor, 2SC1327, Phase Amp. 1st, (L-F)
Tr702	301201134	Transistor, 2SC1327, Phase Amp. 2nd, (L-F)
Tr703	301201134	Transistor, 2SC1327, Matrix Amp., (L-F)

Schematic Location	Part Nol	Description
Tr704	301201134	Transistor, 2SC1327, Phase Amp. 1st, (L-R)
Tr705	301201134	Transistor, 2SC1327, Phase Amp. 2nd, (L-R)
Tr706	301201134	Transistor, 2SC1327, Matrix Amp, (L-R)
Tr707	301201134	Transistor, 2SC1327, Phase Reverse, (L-R)
Tr708	301201134	Transistor, 2SC1327, Phase Amp. 1st, (R-F)
Tr709	301201134	Transistor, 2SC1327, Phase Amp. 2nd, (R-F)
Tr710	301201134	Transistor, 2SC1327, Matrix Amp. (R-F)
Tr711	301201134	Transistor, 2SC1327, Phase Amp. 1st, (R-R)
Tr712	301201134	Transistor, 2SC1327, Phase Amp. 2nd, (R-R)
Tr713	301201134	Transistor, 2SC1327, Matrix Amp., (R-R)
	140800138	Printed Circuit Board
	141810138	4 channel Decoder Circuit Board Assembly

DISTRIBUTING CIRCUIT BOARD ASSEMBLY

Schematic Location	Part No.	Description
	RESISTORS	
R201	552082122	Resistor, Carbon Film, 820 ±5%, 1/4W
R202	552082122	Resistor, Carbon Film, 820 ±5%, 1/4W
R203	552047122	Resistor, Carbon Film, 470 ±5%, 1/4W
R204	552047122	Resistor, Carbon Film, 470 ±5%, 1/4W
R205	552068222	Resistor, Carbon Film, 6.8K ±5%, 1/4W
R206	552015222	Resistor, Carbon Film, 1.5K ±5%, 1/4W
R207	552015122	Resistor, Carbon Film, 150 ±5%, 1/4W
	CAPACITORS	
C201	402470519	Capacitor, Electrolytic, 470mfd, 16V

Schematic Location	Part No.	Description
C202	402220419	Capacitor, Electrolytic, 2,200mfd, 16V
C203	402100439	Capacitor, Electrolytic, 1,000mfd, 35V
C204	402100439	Capacitor, Electrolytic, 1,000mfd, 35V
	DIODES	
D201	300313004	Diode, Zener, BZ-120, Regulator
	140800135	Printed Circuit Board
	141810140	Distributing Circuit Board Assembly

QUAD-STEREO SWITCH CIRCUIT BOARD ASSEMBLY

Schematic Location	Part No.	Description
	RESISTORS	
R901	552015422	Resistor, Carbon Film, 150K ±5%, 1/4W
R902	552015422	Resistor, Carbon Film, 150K ±5%, 1/4W

Schematic Location	Part No.	Description
	613000020	Switch, Quad-Stereo
	140800139	Printed Circuit Board
	141810139	Quad-Stereo Switch Circuit Board Assembly